

IN THE CLAIMS:

Please cancel claims 1-7 without prejudice to or disclaimer of the subject matter recited therein.

Please add new claims 8-14 as follows:

LISTING OF CURRENT CLAIMS

Claims 1-7. (Canceled)

Claim 8. (New) A method for fabrication of polycrystalline silicon thin film transistors comprising the steps of:

- a) selecting a substrate;
- b) forming a buffer oxide on the substrate;
- 5 c) depositing a first amorphous silicon film on the buffer oxide;
- d) depositing a low-temperature oxide on the first amorphous silicon film;
- e) forming a hard mask being a photoresist on the low temperature polycrystalline silicon thin film transistor (LTPS-TFT) as an active layer;
- 10 f) etching the buffer oxide utilizing a solution of silicon dioxide for wet isotropic etching;
- g) depositing a second amorphous silicon film on the active layer;
- h) forming a polysilicon spacer by dry etching behind either side of the active layer of the low temperature polycrystalline silicon thin film transistor (LTPS-TFT); and
- 15 i) forming large silicon grain structures in the active layer by annealing and recrystallization of an dog-bone shaped portion of the active layer utilizing one of a high-energy continuous wavelength laser and an excimer laser,
- 20 wherein the low temperature oxide being a stop layer for the first amorphous silicon film during the dry etching process, and a thermal insulating layer and a hard mask for the first amorphous silicon film during laser annealing thereby protecting the polysilicon spacer from removal.

Claim 9. (New) The method according to claim 8, wherein the polysilicon spacer is selected from a group consisting of polycrystalline silicon film and amorphous silicon film.

Claim 10. (New) The method according to claim 8, wherein the polysilicon spacer of the forming step h) is formed on form two opposing sides of the active layer, the active layer is selected from a group consisting of a thin film transistor (TFT) and a silicon-on-insulator metal oxide semiconductor field effect transistor (SOI-MOSFET) in one of a low temperature and a high temperature process.

Claim 11. (New) The method according to claim 10, wherein in the forming step i) the annealing is performed utilizing a method selected from a group consisting of excimer laser annealing (ELA), solid phase crystallization (SPC), and metal-induced lateral crystallization (MILC), and the polysilicon spacer being formed on opposing sides to the active layer.

Claim 12. (New) The method according to claim 8, wherein the polysilicon spacer of the forming step h) generates a temperature gradient.

Claim 13. (New) The method according to claim 8, wherein the etching step (f) is performed before the removal of said hard mask.

Claim 14. (New) The method according to claim 8, wherein the etching step (f) is performed after the removal of said hard mask.

Prior Art--. No "new matter" has been added to the original disclosure by the amendments to these figures. It is believed the foregoing proposed amendments obviate the outstanding objections to the drawings. Entry of the corrected drawings is respectfully requested.

New Claims

By this Amendment, Applicant has canceled claims 1-7 and has added new claims 8-14 to this application. It is believed that the new claims specifically set forth each element of Applicant's invention in full compliance with 35 U.S.C. § 112, and define subject matter that is patentably distinguishable over the cited prior art, taken individually or in combination.

Forming a poly-Si spacer beside a silicon island is well-known; and forming a poly-Si spacer beside an active island and a Si gate is also known. Even though the present invention utilizes this technology, the present invention is distinguished by the main idea of re-crystallization for amorphous silicon. The present invention forms an a-Si spacer beside an active island, having the following characteristics:

1. To enlarge the crystal formed by laser crystallization. The temperature needed for laser re-crystallization is provided by covering an a-Si spacer on a Si island which means forming an a-Si spacer beside a Si island as well as processing a laser re-crystallization; and
2. To prevent the Si island from a surface tension induced shrinkage, which is a by-product of previous usage of the process discussed above. In the present invention, the silicon spacers are removed after laser re-crystallization, which is not found in any patent.

The present invention is both focused on forming an a-Si spacer beside a Si island and processing a laser re-crystallization, which is applied to a silicon component.

Kato et al. do not teach depositing a second amorphous silicon film on the active layer; forming a polysilicon spacer by dry etching behind either side of the active layer of the low temperature polycrystalline silicon thin film transistor (LTPS-TFT); forming large silicon grain structures in the active layer by annealing and recrystallization of an dog-bone shaped portion of the active layer utilizing one of a high-energy continuous wavelength laser and an excimer laser; nor do Kato et al.

teach the low temperature oxide being a stop layer for the first amorphous silicon film during the dry etching process, and a thermal insulating layer and a hard mask for the first amorphous silicon film during laser annealing thereby protecting the polysilicon spacer from removal.

Hasegawa does not teach depositing a low-temperature oxide on the first amorphous silicon film; forming a hard mask being a photoresist on the low temperature polycrystalline silicon thin film transistor (LTPS-TFT) as an active layer; forming large silicon grain structures in the active layer by annealing and recrystallization of an dog-bone shaped portion of the active layer utilizing one of a high-energy continuous wavelength laser and an excimer laser; nor does Hasegawa teach the low temperature oxide being a stop layer for the first amorphous silicon film during the dry etching process, and a thermal insulating layer and a hard mask for the first amorphous silicon film during laser annealing thereby protecting the polysilicon spacer from removal.

Even if the teachings of Kato et al. and Hasegawa were combined, as suggested by the Examiner, the resultant combination does not suggest: forming large silicon grain structures in the active layer by annealing and recrystallization of an dog-bone shaped portion of the active layer utilizing one of a high-energy continuous wavelength laser and an excimer laser; nor does the combination suggest the low temperature oxide being a stop layer for the first amorphous silicon film during the dry etching process, and a thermal insulating layer and a hard mask for the first amorphous silicon film during laser annealing thereby protecting the polysilicon spacer from removal.

It is a basic principle of U.S. patent law that it is improper to arbitrarily pick and choose prior art patents and combine selected portions of the selected patents on the basis of Applicant's disclosure to create a hypothetical combination which allegedly renders a claim obvious, unless there is some direction in the selected prior art patents to combine the selected teachings in a manner so as to negate the patentability of the claimed subject matter. This principle was enunciated over 40 years ago by the Court of Customs and Patent Appeals in In re Rothermel and Waddell, 125 USPQ 328 (CCPA 1960) wherein the court stated, at page 331:

The examiner and the board in rejecting the appealed claims did so by what appears to us to be a piecemeal reconstruction of the prior art patents in the light of appellants' disclosure. ... It is easy now to attribute to this prior art the knowledge which was first made available by appellants and then to assume that it would have been obvious to one having the ordinary skill in the art to make these suggested reconstructions. While such a reconstruction of the art may be an alluring way to rationalize a rejection of the claims, it is not the type of rejection which the statute authorizes.

The same conclusion was later reached by the Court of Appeals for the Federal Circuit in Orthopedic Equipment Company Inc. v. United States, 217 USPQ 193 (Fed.Cir. 1983). In that decision, the court stated, at page 199:

As has been previously explained, the available art shows each of the elements of the claims in suit. Armed with this information, would it then be non-obvious to this person of ordinary skill in the art to coordinate these elements in the same manner as the claims in suit? The difficulty which attaches to all honest attempts to answer this question can be attributed to the strong temptation to rely on hindsight while undertaking this evaluation. It is wrong to use the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit. Monday morning quarterbacking is quite improper when resolving the question of non-obviousness in a court of law.

In In re Geiger, 2 USPQ2d, 1276 (Fed.Cir. 1987) the court stated, at page 1278:

We agree with appellant that the PTO has failed to establish a *prima facie* case of obviousness. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the combination.

Application No. 10/601,701

Applicant submits that there is not the slightest suggestion in either Kato et al. or Hasegawa that their respective teachings may be combined as suggested by the Examiner. Case law is clear that, absent any such teaching or suggestion in the prior art, such a combination cannot be made under 35 U.S.C. § 103.

Neither Kato et al. nor Hasegawa disclose, or suggest a modification of their specifically disclosed structures that would lead one having ordinary skill in the art to arrive at Applicant's claimed structure. Applicant hereby respectfully submits that no combination of the cited prior art renders obvious Applicant's new claims.

Summary

In view of the foregoing amendments and remarks, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

Date: March 3, 2005

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